

glider

Make a glider that twists and turns!

Sent in by Andrew C. of Sykesville, MD

What You Need

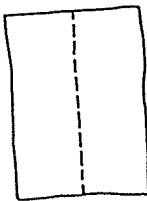
- sheet of 8.5" x 11" paper
- small paper clip
- scissors



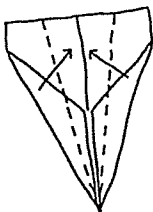
Science Scoop

- If both flaps are **up**, air pushes on the flaps, which pushes the back of the glider downward. This makes the front of the glider turn upward.
- If both flaps are **down**, the air pushes on the flaps, which pushes the back of the glider upward. This makes the front of the glider turn downward.
- If one flap is **up** and the other is **down**, air pushes so that one side of the glider goes up and the other side goes down. This makes the glider spin and flip.

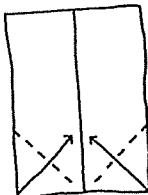
1 Fold the sheet of paper in half the long way, then **open** it.



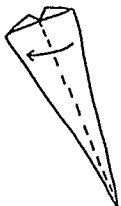
4 Fold the sides to the center one last time!



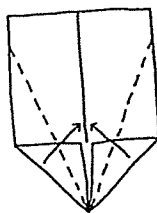
2 Fold the top corners of the paper to the center so that you have two triangles at the top.



5 Fold the plane in half, the opposite way.



3 Fold both sides over to the center again.



6 Flip the glider over and **open** the wings. **Clip** a paper clip to the bottom of the glider.

7 Cut a flap on one end of each wing. Bend both flaps **up**.



8 Throw your glider. How does it fly?

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Try It Out!

Now it's time for you to experiment! Fold the flaps in different ways—like both flaps down, or one flap down and the other flap up. How does the glider fly each time? What happens if you make the flaps bigger or smaller? Change one thing (that the variable) and make a prediction. Then test it and send your results to ZOOM.



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Hang Time

Time to drop everything. Really! Build some copters and race them. The winner hits the ground LAST. Look out below!

FOOTCH!
with Ruff
Ruffman™

What to DO

1 Get what you need.

- A few sheets of paper
- Scissors
- Paper clips (1 large and 1 small)

2 Make your copter.

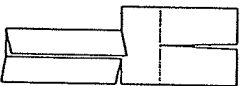
Cut out the copter printed on this page. Cut along the dotted lines. Assemble it as shown.

3 Launch your copter.

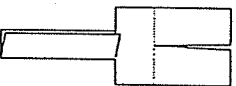
Hold your copter as high as you can. Let go and watch as it falls. Does it spin to the ground?

4 Change your copter.

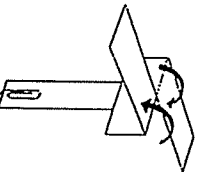
Build a second copter of your own design. This time, change a feature, such as the copter's size or shape of the blades. Try using more or fewer paper clips. Then launch both the new and original copter designs and compare how they fall. What kind of difference did your change make?



Fold Tab A over Tab B.



Fold Tab C over Tab B.

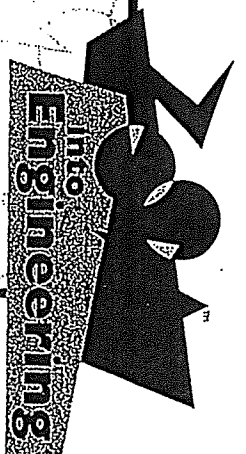


Fold blades D and E in opposite directions. Slip on a paper clip.

Chew on This

When you drop your copter, its blades hit the air. The air pushes back on the blades, giving each one a little push forward. Notice how the blades are not exactly across from each other. This means that one blade is nudging one side of the copter around while the other blade is nudging the other side around. These two pushes work together to spin the copter around its center point. The spinning blades hit a lot of air on the way down, and all this air pushes back on the blades. The more air you can get to hit your blades (i.e., the more push-back you can create), the slower your copter will fall.

Hoop Glider



What You Need

- paper
- ruler
- scissors
- pencil
- nonbendable, plastic drinking straw
- tape



Engineering Scoop

If you throw a **plain straw**, it doesn't go very far. But when you add **paper hoops**, the straw glides through the air. That's because the hoops act like **wings**. Things that **fly**—like insects, birds, and airplanes—all have wings. But wings are not all the same **shape** and **size**. Different wings can be better for different kinds of flight. For example, an eagle has **long, wide wings** that help it glide. An airplane has **wings with small flaps** that move up and down to turn the plane. Try **changing** the wings on your glider. How does it **fly** with different wings?

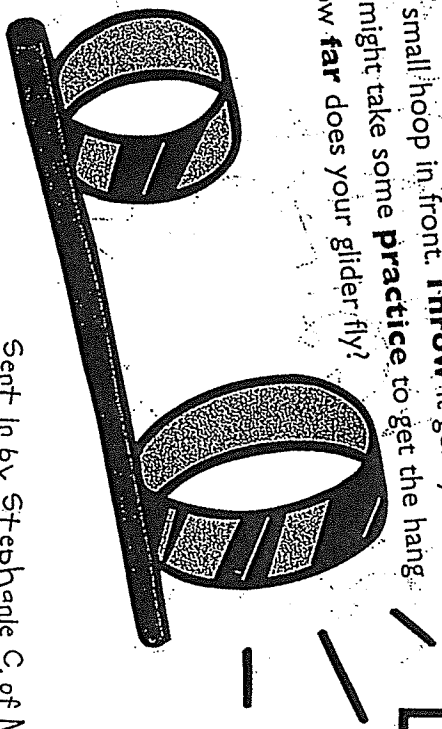
1 Cut two strips of paper. Make one strip **1 inch wide and 5 inches long**. Make the second strip **1 inch wide and 10 inches long**.

2 Curl each paper strip into a hoop. **Tape** the ends together. Now you have a big hoop and a small hoop.

3 Tape the small hoop to one end of the straw.

4 Tape the big hoop on the other end of the straw. Make sure the big hoop **lines up** with the small hoop.

5 Hold your Hoop Glider in the middle of the straw, with the small hoop in front. **Throw** it gently like a spear. It might take some **practice** to get the hang of it. How **far** does your glider fly?



Sent in by Stephanie C. of Milton, NH



Change your glider so that it flies the longest possible distance. What happens if you make the **straw smaller**? What happens if you change the **size of the hoops**? Or, what happens if you add a **third hoop**? Choose one thing to change (that's the **variable**), and make a **prediction**. Then **test** it and **send** your results to ZOOM.



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ZOOM and Engineering is a partnership of WGBH and National Engineers Week. National Engineers Week 2002 (during DuPont and the American Society of Civil Engineers, ZOOM is produced by WGBH Boston. Funding for ZOOM is provided by the National Science Foundation, the Corporation for Public Broadcasting, the Arthur Vining Davis Foundations, and public television viewers. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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